1. Determine the appropriate model for the graph of points below.
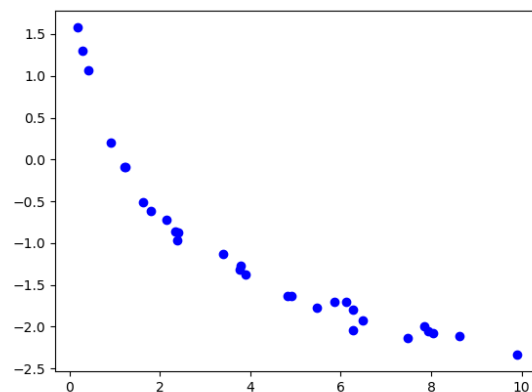

   A. Non-linear Power model

   B. Exponential model

   C. Linear model

   D. Logarithmic model

   E. None of the above

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2. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 38 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

   A. About 13 percent

   B. About 11 percent

   C. About 17 percent

   D. About 19 percent

   E. None of the above

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3. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 43 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?
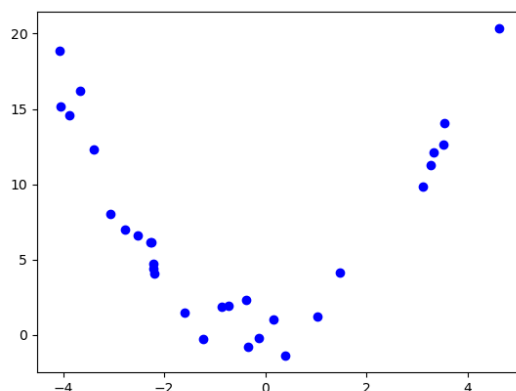
   A. About 13 percent

   B. About 22 percent

   C. About 20 percent

   D. About 4 percent

   E. None of the above

4. Determine the appropriate model for the graph of points below.

   A. Linear model

   B. Exponential model

   C. Non-linear Power model

   D. Logarithmic model

   E. None of the above

5. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 4 many cases reported, but the number of confirmed cases has doubled every 1 days. How long will it be until there are at least 100000 confirmed cases?

   A. About 6 days

   B. About 5 days

   C. About 15 days

   D. About 11 days

   E. There is not enough information to solve the problem.

6. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 25 liter 23 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 17 percent and 32 percent solutions, what was the amount she used of the 17 percent solution?

   A. $12.50 liters$

   B. $12.79 liters$

   C. $15.00 liters$

   D. $10.00 liters$

   E. There is not enough information to solve the problem.

7. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 16 liter 34 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 13

percent and 39 percent solutions, what was the amount she used of the 39 percent solution?

    A. $12.92 liters$

    B. $3.08 liters$

    C. $7.91 liters$

    D. $8.00 liters$

    E. There is not enough information to solve the problem.

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8. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that the time spent on each path was equal.*

    A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 6 mph, 12 mph when traveling down a hill, and 8 mph when traveling along a flat portion.

    A. $576.000D$

    B. $0.375D$

    C. $26.000D$

    D. The model can be found with the information provided, but isn't options 1-3

    E. The model cannot be found with the information provided.

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9. The temperature of an object, T, in a different surrounding temperature T_s will behave according to the formula $T(t) = Ae^{kt} + T_s$, where t is minutes, A is a constant, and k is a constant. Use this formula and the situation below to construct a model that describes the uranium's temperature, T, based on the amount of time t (in minutes) that have passed. Choose the correct constant k from the options below.

    Uranium is taken out of the reactor with a temperature of $130°$ C and is placed into a $20°$ C bath to cool. After 19 minutes, the uranium has cooled to $85°$ C.

    A. $k = -0.03648$

    B. $k = -0.03854$

    C. $k = -0.03744$

    D. $k = -0.02769$

    E. None of the above

10. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 6 many cases reported, but the number of confirmed cases has doubled every 4 days. How long will it be until there are at least 1000000 confirmed cases?

    A. About 20 days

    B. About 70 days

    C. About 49 days

    D. About 23 days

    E. There is not enough information to solve the problem.